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(54) **DECORATIVE LIGHT DISPLAY**

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G09F 13/22 (2006.01)
A47G 33/08 (2006.01)
B44C 5/00 (2006.01)

(52) **U.S. Cl.**
CPC **G09F 13/22** (2013.01); **A47G 33/08** (2013.01); **B44C 5/00** (2013.01)

(58) **Field of Classification Search**

USPC 40/544; 362/249.06; 428/8
See application file for complete search history.

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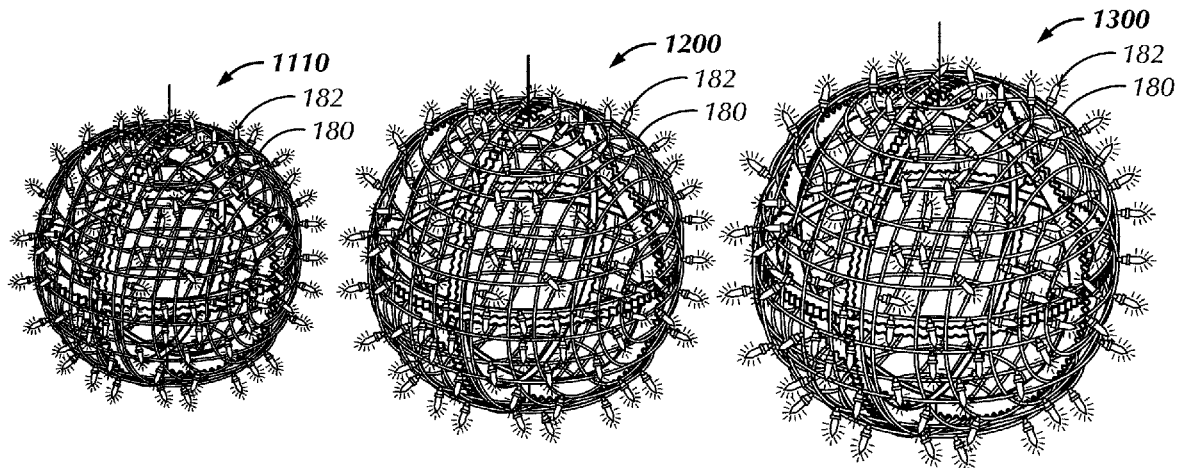
Primary Examiner — Joanne Silbermann

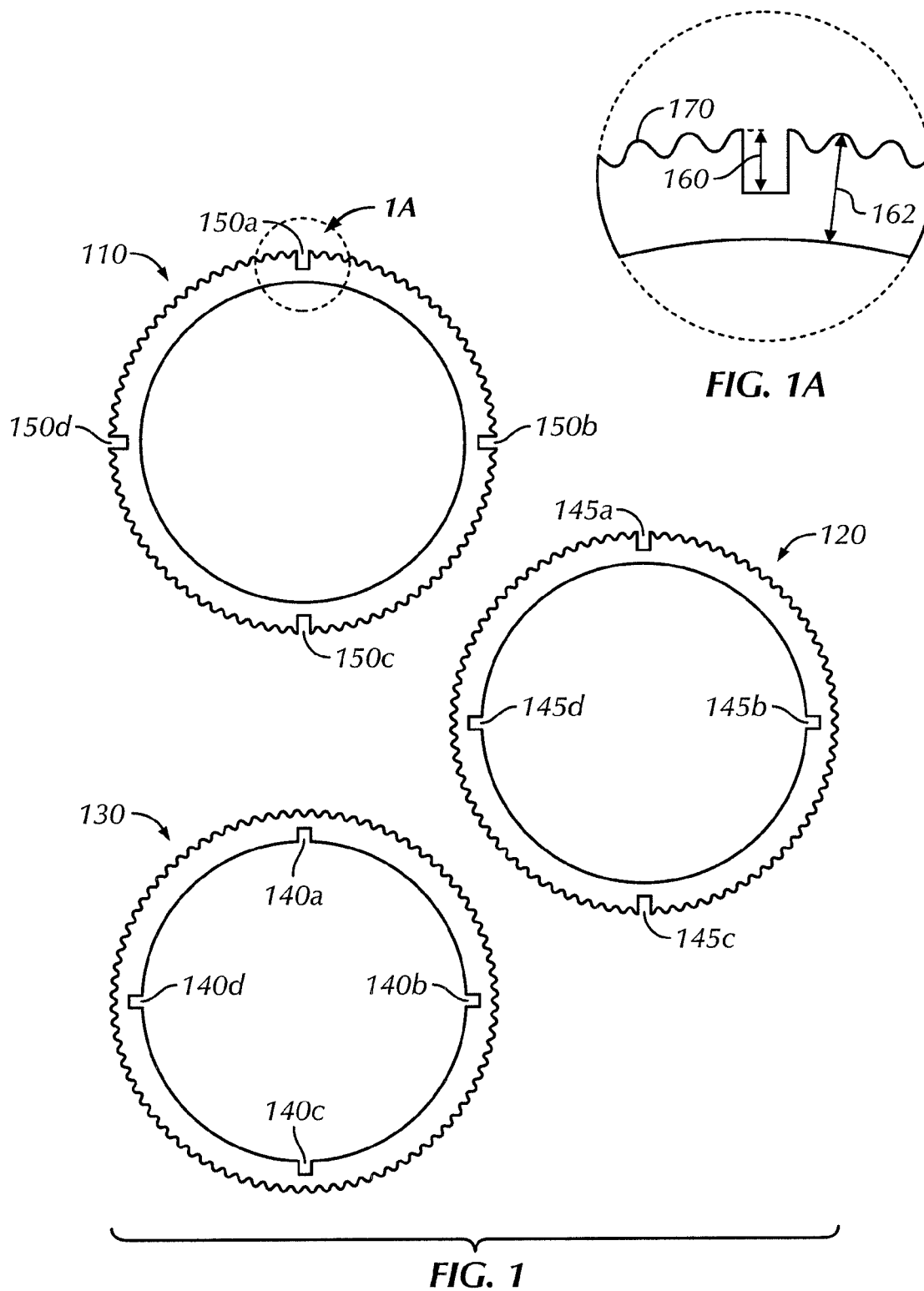
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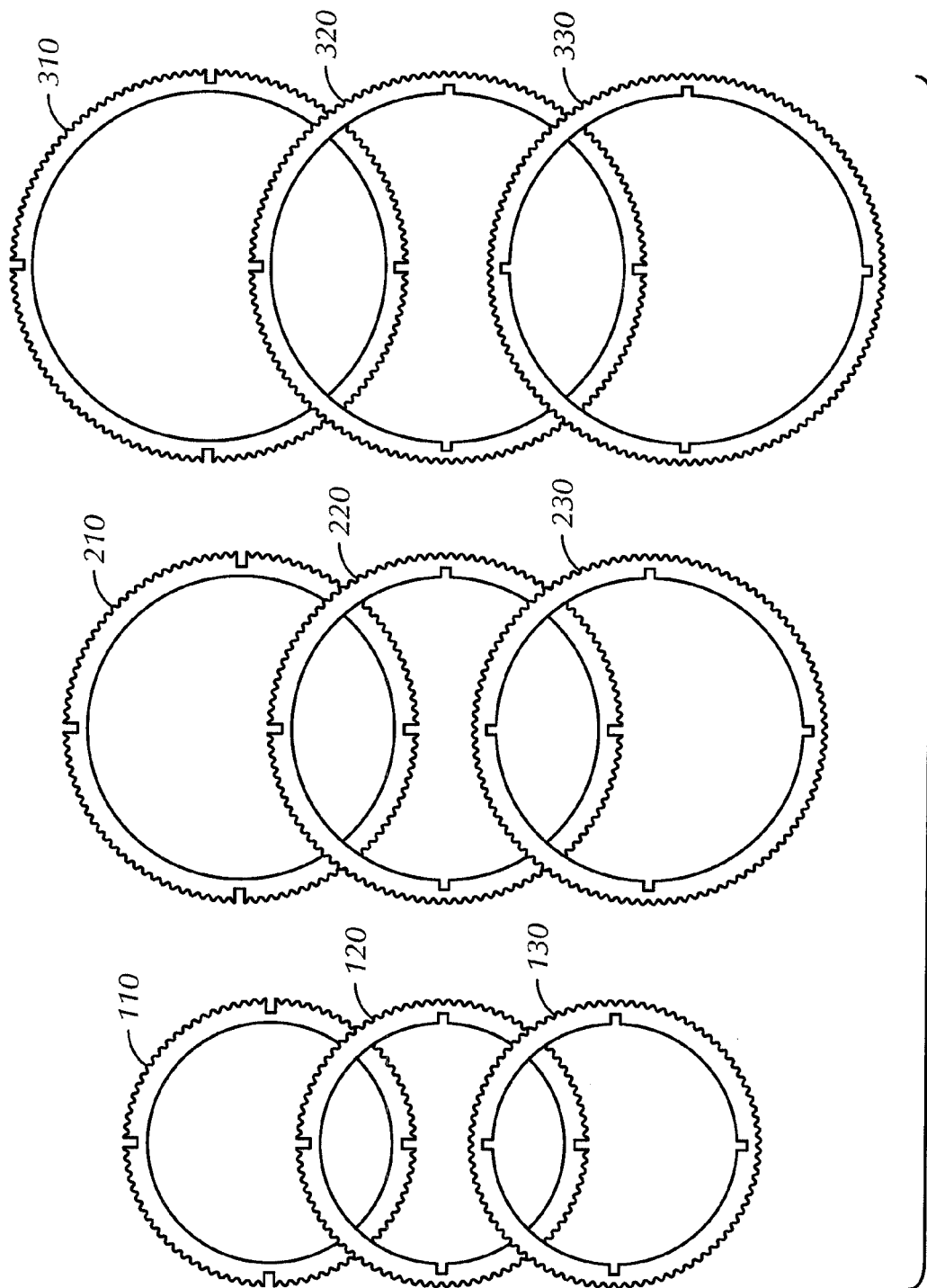
(57) **ABSTRACT**

A decorative light display used with a decorative string of lights comprises an inner and an outer flexible circular-shaped substructure, the flexible substructures including a pair of interlocking notches allowing the substructures to be assembled together to form a generally spherically shaped framework; the substructures having inner and outer circumferences, wherein the notches are formed on the inner circumference of the outer flexible substructure and the outer circumference of the inner flexible substructure; further comprising a sinusoidal wave shape formed on the outer circumferences of the flexible substructures for securing the decorative string of lights in contact therewith.

21 Claims, 8 Drawing Sheets







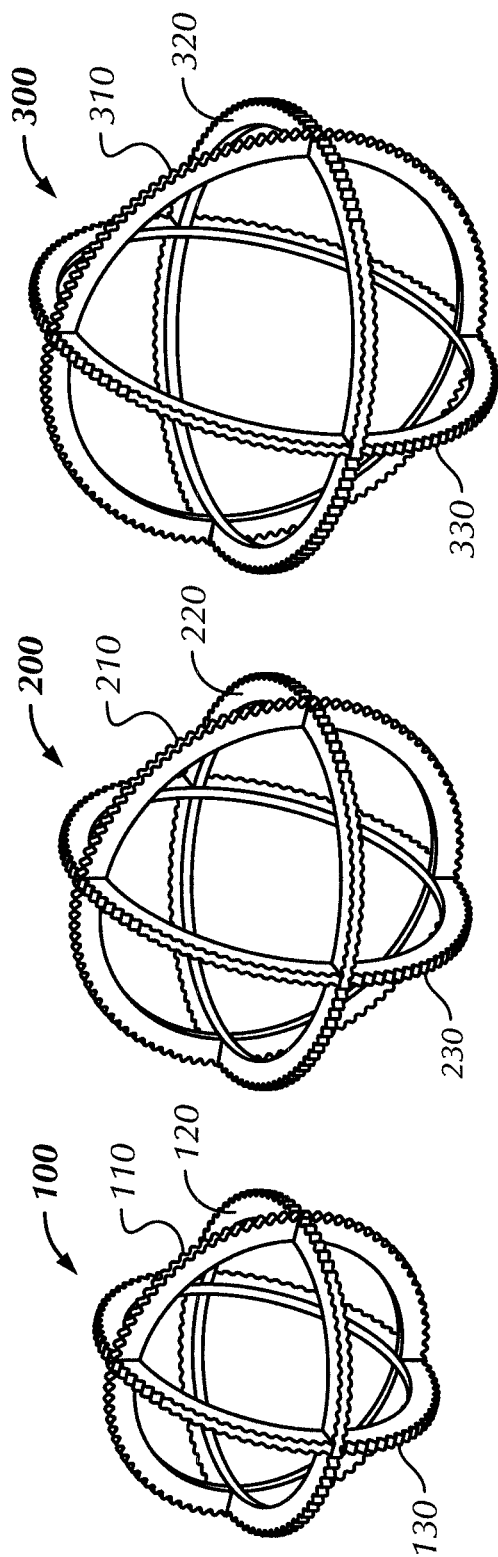


FIG. 3

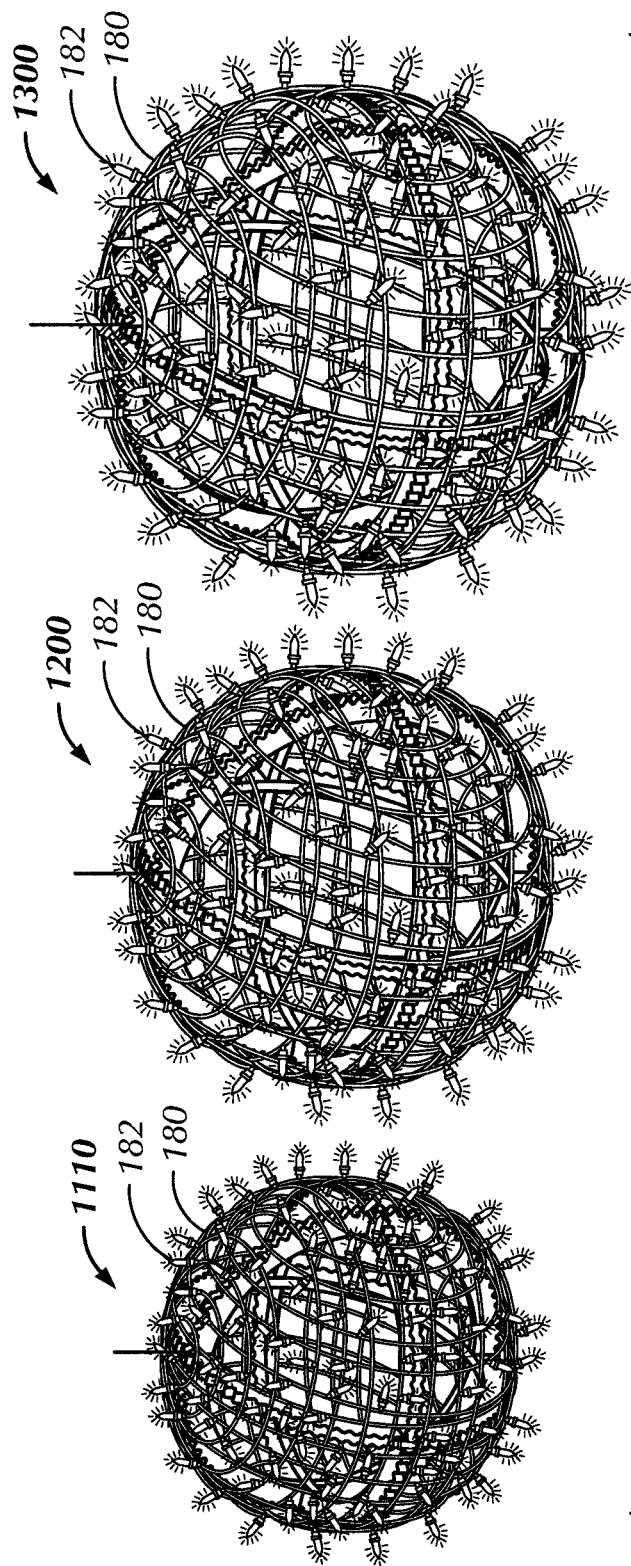


FIG. 4

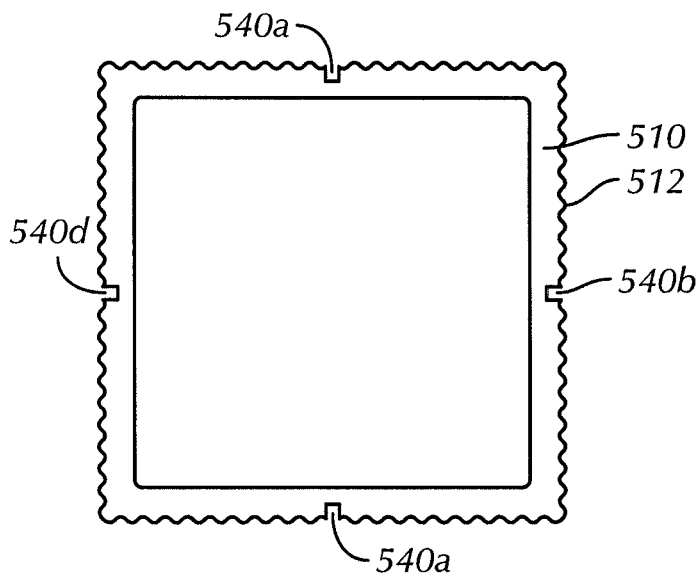


FIG. 5

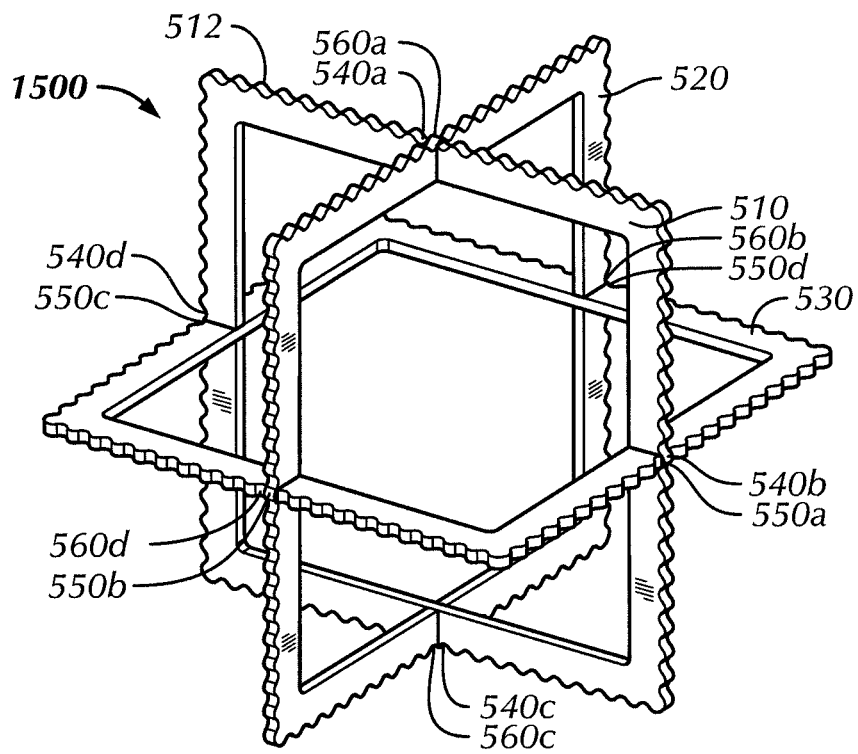
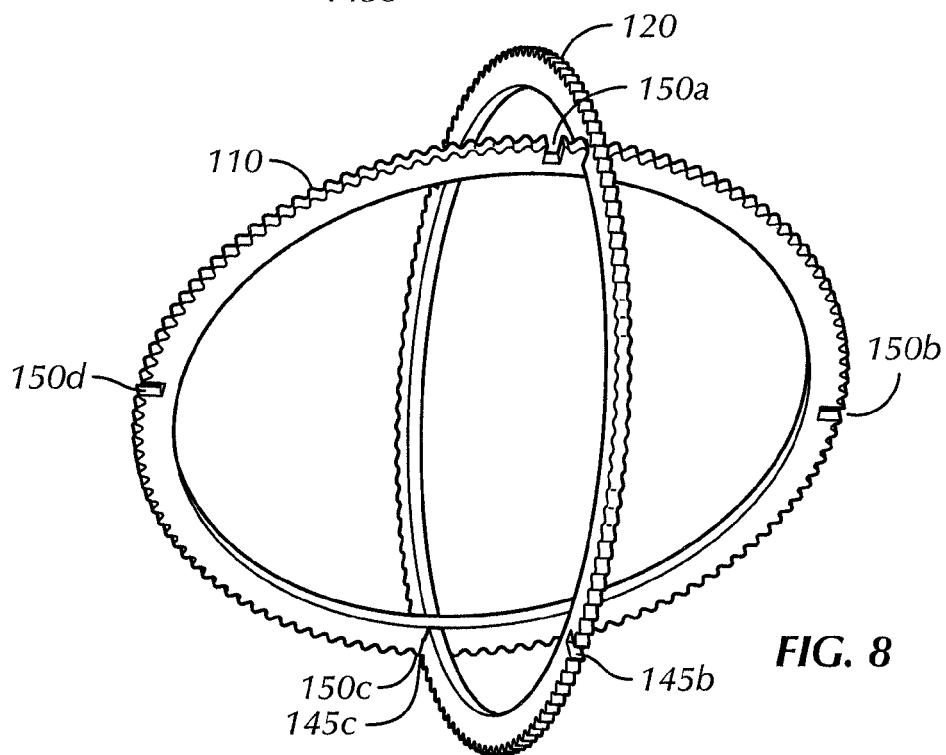
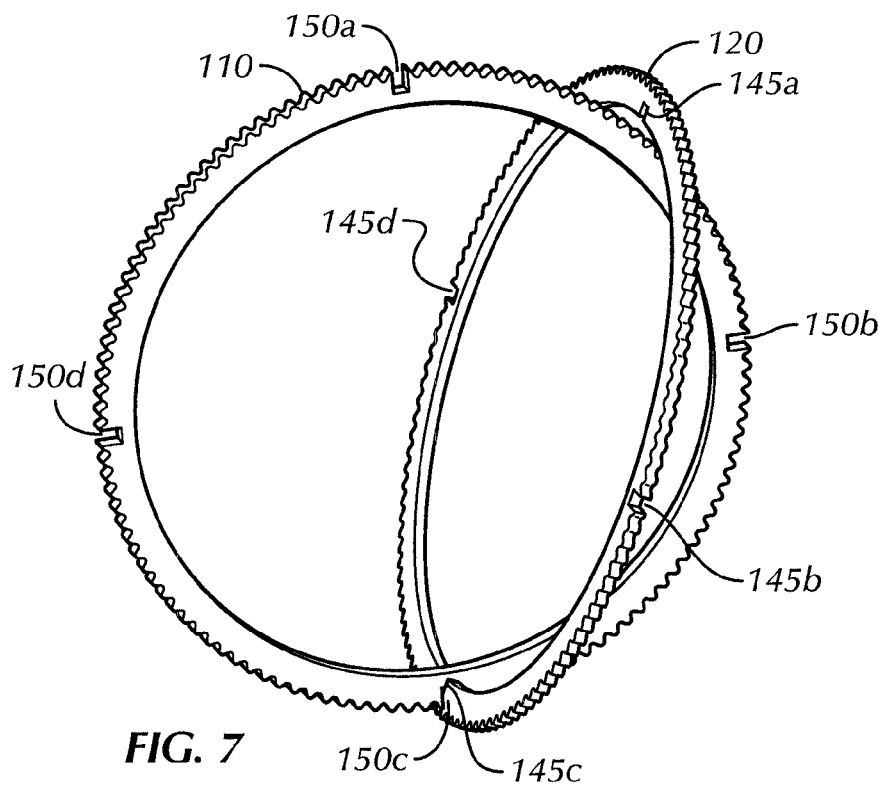


FIG. 6



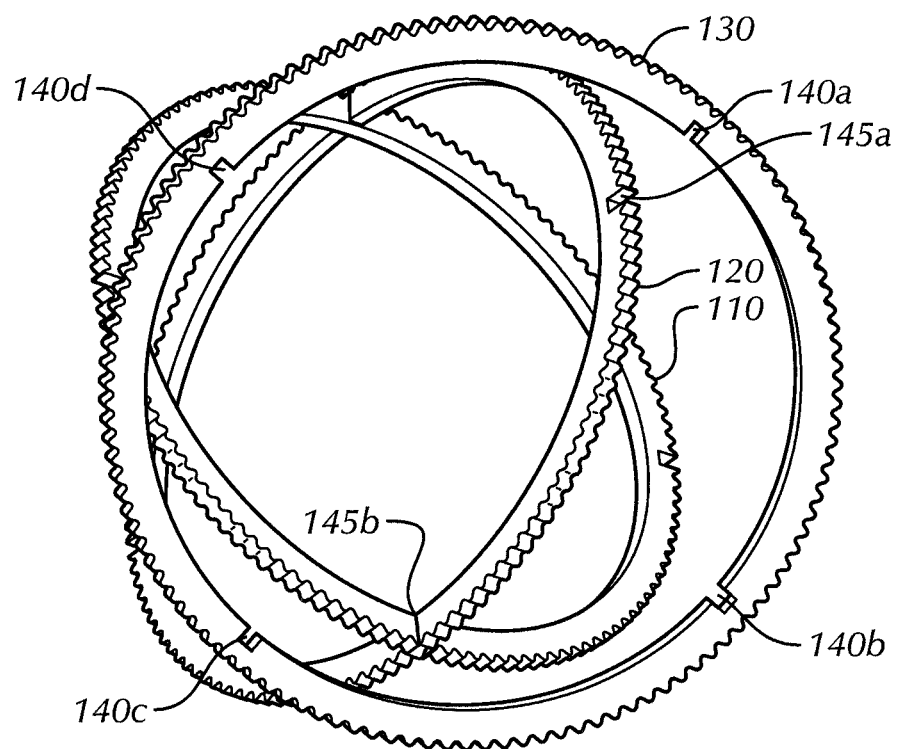


FIG. 9

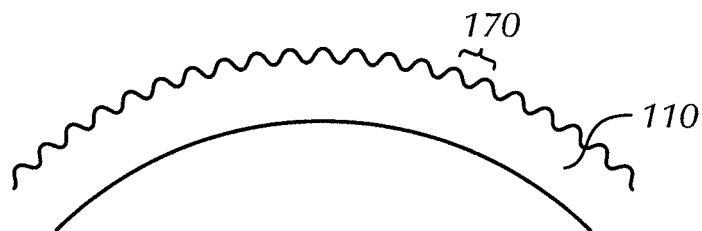


FIG. 10

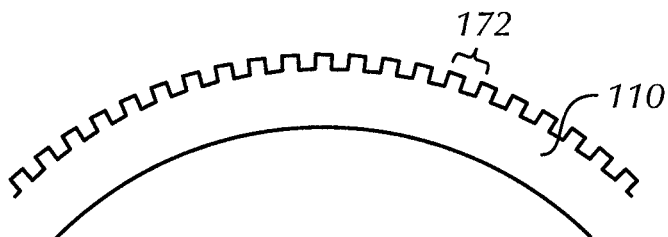


FIG. 11

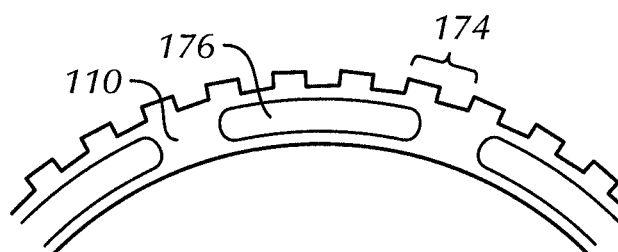


FIG. 12

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DECORATIVE LIGHT DISPLAY**CROSS REFERENCE TO RELATED APPLICATIONS**

This application is a continuation of provisional application Ser. No. 61/354,545 filed Jun. 14, 2010, incorporated by reference herein.

BACKGROUND**1. Field of the Invention**

This invention relates to decorative light displays, and more particularly, to a decorative light display that accepts stranded light sets and is easily repaired, assembled and disassembled.

2. Description of the Related Art

Current decorative light displays or designs are made to hold individual light strands in spherical, star or other shapes, such as a reindeer or a Christmas tree. Known designs may be made of a solid material with a light placed internally that illuminates the outer surface. Other displays are generally made of a solid framework, with the lights disposed in a string or strand wrapped around the periphery thereof.

Grapevines are also used in decorative light displays. Grapevines are collected from a vineyard, wrapped in the shape of a ball, and dried. Strings of lights are clipped or otherwise attached to the surface of the resulting ball. Grapevine balls, of course, pose a significant fire hazard, are particularly expensive, as they require a substantial investment in labor in the construction thereof, and involve an increased cost relating to the clips used to attach the lights to the ball.

Styrofoam balls are also utilized as the foundation upon which light strands are attached. Styrofoam ball light displays must have the lights disposed on the exterior surface thereof, and are unable to have a light disposed in the interior. Thus, styrofoam balls cannot be used to form lamp-like structures. As noted above with respect to grapevine balls, additional costs are also associated with the clips needed to attach the lights to the ball.

Rigid metal hoops are also assembled to form frameworks upon which light strands may be draped. Such hoops are quite heavy and are relatively expensive, as extensive metal fabrication is required to make the hoops. The outer circumference of known metal displays is smooth. The smooth outer circumference permits the light strands wrapped thereon to slide off or dangle freely, thus creating an unattractive appearance.

It is often difficult to transport and store known displays to and from storage, as they are frequently large and delicate, requiring great care in handling. In addition, large, uneconomical spaces are needed to store such displays when not being used.

It is difficult to repair or replace lights in the light string of known decorative light displays, as the light strands disposed thereon often become tangled.

SUMMARY OF THE INVENTION

In accord with the present invention, a display used with a decorative string comprises a plurality of flexible substructures. The flexible substructures include an interlocking mechanism allowing the substructures to be assembled together to form a framework. The flexible substructures further include a wavy surface holding the decorative string in contact therewith.

Further in accord with the present invention, a decorative light display used with a decorative light string comprises an

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inner flexible substructure, a middle flexible substructure, and an outer flexible substructure. The flexible substructures include an interlocking mechanism allowing the substructures to be assembled together to form a framework. The flexible substructures support the decorative light string in contact therewith.

Still further in accord with the present invention, a decorative light display used with a decorative string of lights comprises an inner and an outer flexible circular-shaped substructure. The flexible substructures include a pair of interlocking notches allowing the substructures to be assembled together to form a generally spherically shaped framework. The substructures have inner and outer circumferences, wherein the notches are formed on the inner circumference of the outer flexible substructure and the outer circumference of the inner flexible substructure. A sinusoidal wave shape is formed on the outer circumferences of the flexible substructures for securing the decorative string of lights in contact therewith.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 depicts a spherical decorative light display in accord with one embodiment of the present invention;

FIG. 1A is a close-up view of a portion of the decorative light display of FIG. 1;

FIG. 2 depicts three different spherical decorative light displays, each of a different diametrical dimension;

FIG. 3 depicts an assembled spherical decorative framework;

FIG. 4 depicts an assembled spherical decorative display in accord with one embodiment of the present invention;

FIG. 5 depicts a cube-shaped decorative light display in accord with an alternate embodiment of the present invention;

FIG. 6 depicts an assembled cube-shaped decorative light display in accord with the embodiment of FIG. 5;

FIGS. 7 to 9 depict the assembly of a spherical decorative light display in accord with the present invention;

FIG. 10 depicts a sinusoidal wave form surface of a framework in accord with the present invention;

FIG. 11 depicts a square wave form surface of a framework in accord with the present invention; and

FIG. 12 depicts a rectangular wave form surface of a framework in accord with the present invention.

DETAILED DESCRIPTION

It is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless limited otherwise, the terms "connected," "coupled," and "mounted," and variations thereof herein are used broadly and encompass direct and indirect connections, couplings, and mountings. In

addition, the terms “connected” and “coupled” and variations thereof are not restricted to physical or mechanical connections or couplings.

Referring to the drawings, and initially to FIG. 1 thereof, there is depicted a framework or interlocking structure **100** for a spherical decorative light display. The spherical decorative light display or interlocking structure **100** is made of three interlocking rings or circular substructures **110**, **120**, and **130**. It will be appreciated that the substructure **110** may be identified as the inner substructure, the substructure **120** may be identified as the middle substructure, and the substructure **130** may be identified as the outer substructure. The substructures **110**, **120**, and **130** include notches **140**, **145**, and **150**, which are used to lock the individual substructures **110**, **120**, **130** together. In the illustrated embodiment, the substructures **110**, **120**, and **130** are generally circular in shape and are locked together to form a spherical framework. Each substructure **110**, **120**, **130** has four equally spaced notches **140a-d**, **145a-d**, **150a-d** formed therein. Each notch **140a-d**, **145a-d**, **150a-d** is formed 90 degrees apart from the other on the substructures **110**, **120**, **130**. Further, depending on the orientation and function of the substructure **110**, **120**, **130**, the notches **140a-d**, **145a-d**, **150a-d** may be on the outer or inner circumference or periphery of the substructure **110**, **120**, **130**. In the depicted embodiment, the inner substructure **110** has notches **150a-d** formed on the outer circumference thereof, the middle substructure **120** has notches **145a-d** formed on both the outer and inner circumferences thereof, and the outer substructure **130** has notches **140a-d** formed on the inner circumference thereof. It is to be noted that the substructure **120** has two inner notches **145b,d** formed on the inner circumference thereof, and two outer notches **145a,c** formed on the outer circumference thereof.

In the illustrated embodiment, the notches **140a,c** and **150a,c** are preferably oriented 180 degrees apart. That is, the notches **140a,c** can be considered to be positioned at the 0 degree and 180 degree positions, and the notches **150a,c** can be considered to be positioned at the 90 degree and 270 degree positions on the substructure **120**. It will be appreciated by those of skill that the notches **140a-d**, **145a-d**, and **150a-d** may be placed at different angled locations on the periphery of the respective substructures depending upon the number of substructures used to construct the decorative light display. If a decorative light display employs four (4) or more substructures, then the associated notches would be positioned at corresponding angles thereon.

The notches **140a-d**, **145a-d**, and **150a-d** are generally of a square or rectangular shape. Persons of skill in the art, however, will recognize that other shapes could be employed in the framework **100**, such as an oval, an ellipse, a Christmas tree, and a cone. The dimensions or sizes of the notches **140a-d**, **145a-d**, and **150a-d** vary as a function of the material used to form substructures **110**, **120**, **130**. A variety of materials such as polymers, plastics, wood, composites, and recycled fiber can be used to form the substructures **110**, **120**, and **130**. In one practical embodiment, the substructures **110**, **120**, and **130** were made from polyvinyl chloride (“PVC”) or acrylonitrile butadiene styrene (“ABS”) polymers. In such a practical embodiment, using PVC or ABS, the notch height **160** was approximately one half the depth of the height **162** of the substructure **110**, **120**, **130**, i.e., the distance **162** from the inner circumference to the outer circumference of the substructure **110**. In one practical embodiment, height **162** was about 1½ inches. As is apparent to one of ordinary skill in the art, the notch height **160** must leave sufficient material on the substructure **110**, **120**, **130** so that the substructure **110**, **120**, **130** is strong enough to withstand the flexing forces applied

thereto during assembly and disassembly of the decorative display **100**, as described more fully hereinbelow in connection with FIGS. 7 to 9, without being too thin and thereby sacrificing structural strength. Sufficient material must remain on the substructure **110**, **120**, **130** to provide sufficient structural strength to the spherical decorative light display **100** once the spherical decorative light display **100** is fully assembled, i.e., sufficient structural strength so that the decorative light display **100** maintains the desired shape once assembled and does not collapse in use.

The thickness of the substructures **110**, **120**, and **130** determines the overall stiffness and rigidity of the spherical decorative light display **100**. If, for example, the substructures **110**, **120**, **130** are too thick, then the spherical decorative light display **100** becomes too stiff to assemble. If, on the other hand, the substructures **110**, **120**, **130** are too thin, the substructures **110**, **120**, **130** will fail during assembly or will not support the light string or strand disposed thereon. (See FIG. 4.) If substructures **110**, **120**, **130** are too thin, substructures **110**, **120**, **130** fail after only a few assemblies and disassemblies, thus exhibiting an undesirably short life span. In one practical embodiment, the spherical decorative light display **100** was made from PVC or ABS and had a thickness of about 0.15 inches to about 0.35 inches, and preferably had a thickness of about 0.19 inches to about 0.31 inches. In another practical embodiment having a 32 inch diameter for the substructures **110**, **120**, **130**, the thickness was from about 0.5 to about 0.75 inches.

The substructures **110**, **120**, and **130** include a wavy or toothed design or shape **170** on the outer circumference thereof. The wavy or toothed shape creates a surface that retains or secures the light strand wires **180** thereto, and yet prevents the light strand wires **180** from bunching together when the light strand wires **180** are wrapped around the spherical decorative light display or framework **100** formed by the interlocked substructures **110**, **120**, **130**. The light strand wires **180** are retained on the wavy surface **170** of the substructures **110**, **120**, **130** using the tension force of the light strand wires **180**. It will be appreciated by those of skill in the art that no other mechanical retention device or mechanism, such as a clip or the like, is needed to secure the light strand wires **180** in contact with the outer circumference of the substructures **110**, **120**, **130**. As illustrated in FIG. 4, the light strand wire **180** is wrapped around the substructures **110**, **120**, **130** whereby the wavy or toothed shape **170** engages the light strand wire **180** and prevents the same from sliding or falling off the substructures **110**, **120**, **130**.

Any wavy shape **170** may be utilized in the present invention, or a combination thereof. In the preferred embodiment, a sinusoidal wave shape **170** (see FIG. 10) is formed in the substructure’s **110**, **120**, **130** outer circumference. It will be appreciated that the amplitude and frequency of the sinusoidal function must be carefully selected. If the amplitude or the frequency of the wavy shape **170** is too large, the light strand **180** will bunch together at the bottom of the substructure **110**, **120**, **130**. If the amplitude or frequency of the wavy shape **170** is too small, there may not be sufficient force to retain the light string **180** in contact therewith. Other designs, such as a square wave **172** (see FIG. 11) or a rectangular wave **174** (see FIG. 12), may be used, but must have sufficient dimensions to prevent the light strand **180** from bunching together while providing sufficient force to retain the light strand **180** in contact with the substructures **110**, **120**, **130**.

It will be appreciated that the substructures **110**, **120**, **130** may be formed with pockets or grooves **176** therein. The pockets **176** are formed so as to reduce the material used in the fabrication thereof, and therefore, reduce the costs of produc-

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tion. Additionally, when the substructures **110**, **120**, **130** are formed by an extrusion process, the substructures **110**, **120**, **130** cool down faster when the pockets or grooves **176** are formed therein. This also permits faster production of the substructures **110**, **120**, **130**.

The substructures **110**, **120**, **130** may be of various dimensions or diameters depending upon the desired shape of the decorative light display **100**. FIG. 2 shows interlocking substructures **110**, **120**, **130**, **210**, **220**, **230**, **310**, **320**, and **330**, having three different internal diameters, thus forming three differently dimensioned spherical decorative frameworks **100**, **200**, **300**. FIG. 3 illustrates the interlocking substructures **110**, **120**, **130**, **210**, **220**, **230**, **310**, **320**, and **330** assembled to form three spherical frameworks **100**, **200**, and **300**. FIG. 4 shows interlocking substructures that have been assembled and are covered or wrapped with the light strand wires **180** secured thereto to form spherical decorative displays **1100**, **1200**, **1300**. The light strand wires **180** include light bulbs **182** for illumination.

It will be appreciated by those of skill in the art that other decorative display shapes may be formed. The shape may be, for example, a sphere, a cube, or a cone. FIG. 5, for example, illustrates an inner substructure **510** that is used to form a cube-shaped decorative display **1500** (see FIG. 6). As in the case of the previous embodiments utilizing the circular-shaped substructures **110**, **120**, **130**, discussed hereinbefore, the substructure **510** is formed with a wavy surface shape or tooth **512** and notches **540a-d** positioned on the outer periphery thereof. FIG. 6 depicts a decorative display **1500** having a generally cube-shaped configuration assembled from three square substructures **510**, **520**, and **530**. The substructure **510** may be considered as an outer substructure, the substructure **520** may be considered a middle substructure, and the substructure **530** may be considered an inner substructure. The substructure **530** includes a wavy surface shape or teeth **512** and notches **550a-d** on the inner periphery thereof. The middle substructure **520** also has a wavy surface shape or teeth **512** and notches **560a-d** on its inner and outer peripheries. While not shown, other design shapes, such as spheroid, conical, cylindrical, etc., may also be formed.

FIGS. 7 to 9 illustrate a method of assembling a decorative light display or interlocking structure **100** according to the present invention. FIG. 7 depicts the assembly of the inner substructure **110** and the middle substructure **120**. The outer notch **150a** disposed on the inner substructure **110** is mated with the inner notch **145a** on the middle substructure **120**. As shown in FIG. 8, the substructure **120** is then flexed, stretched or pulled over the outer circumference of the inner substructure **110** until the second inner notch **145c** of substructure **120**, opposite the first inner notch **145a**, is mated with the second outer notch **150c** of the substructure **110**. It will be appreciated that the second outer notch **150c** is opposite the first outer notch **150a**. After the inner substructure **110** and the middle substructure **120** are interlocked, the outer substructure **130** is added to the assembly, as depicted in FIG. 9. One inner notch **140a,c** on the outer substructure **130** is mated with an outer notch **145a,c**, **150a,c** on either the middle substructure **120** or the inner substructure **110**. The outer substructure **130** is then flexed, pulled or stretched to allow the other notches **145a,c**, **150a,c** to mate with the remaining notches on both the inner substructure **110** and the middle substructure **120**. As discussed hereinbefore, the selection of the materials of the substructures **110**, **120**, **130** dictate the thickness of the substructures **110**, **120**, **130** as necessary to allow the substructures **110**, **120**, **130** to flex during assembly or disassembly, but provide the necessary rigidity to support the light strand wires **180**.

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Once the substructures **110**, **120**, **130** are interlocked, thus forming the framework of the decorative display **100**, the light strand wires **180** are wrapped around the framework to create the completed decorative display **100**. It will be appreciated from the above that the decorative display **100** may be disassembled by reversing the steps hereinbefore described, and the decorative display **100** will be compact and ready for storage.

It is envisioned that the present invention may be manufactured from plastic material on a Computed Numerically Controlled Machine ("CNC") machine, such as a CNC laser cutting machine, a CNC water jet cutting machine, a CNC router or the like. Injection molding, vacuum molding, or similar forming methods will also be suggested to those of skill in the art. Additionally, the invention may also be constructed by hand using a band or jig saw or a hand router. As noted hereinbefore, the interlocking structures **110**, **120**, **130** may be manufactured using PVC or ABS polymers. The structures may also be made from any polymer, plastic, wood, or composite material, as well as recycled fibers such as fiber board, all as desired by persons of skill in the art.

It will be appreciated that the method and structure of the present invention provide unique advantages over known art displays. The structures are easily assembled, disassembled and stored, and the light strand wires **180** may be easily attached, repaired and removed. It will also be appreciated that other decorative strings or strands may be used in conjunction with the substructures **110**, **120**, **130**, such as beads, ribbons, garlands, Mylar sheets or the like that do not necessarily emit light, and the invention would function in the above-described manner just as it does with the light strand wires **180**. In addition, a light may be placed within inner substructure **130**, with Mylar sheets disposed on substructures **110**, **120**, **130**, forming a lamp-like light source.

The foregoing description of embodiments of the invention has been presented for purposes of illustration. It is not intended to be exhaustive or to limit the invention to the precise steps and/or forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. It is intended that the scope of the invention be defined by the claims appended hereto.

What is claimed is:

1. A display for a decorative strand comprising:

at least one outer flexible substructure and one inner flexible substructure, said outer and inner flexible substructures comprising continuous strips of flexible material of substantially the same size and shape,

each substructure having an outer dimension and inner dimension,

said outer and inner dimensions of said flexible substructures including an interlocking mechanism that is configured for allowing said substructures to be assembled together to form a three-dimensional framework with the outer dimensions being substantially coextensive with each other,

the flexible substructures being of sufficient shape and flexibility for the inner and outer substructures to be assembled together in a fixed relationship relative to each other and of sufficient shape and rigidity for the three-dimensional framework to stand on its own and support decorative strand wires mounted thereon,

the outer dimensions of said flexible substructures further including a surface that is shaped to retain said decorative strand of wires on the outer surfaces of said flexible substructures.

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2. The display of claim 1; wherein said interlocking mechanism comprises a pair of interlocking notches formed on cooperating surfaces of said flexible substructures.

3. The display of claim 2; wherein said inner and outer dimensions have inner and outer circumferences; wherein said flexible substructures comprise an inner flexible substructure and an outer flexible substructure; and wherein said notches are formed on said inner circumference of said outer flexible substructure and said outer circumference of said inner flexible substructure.

4. The display of claim 3; wherein said notches on each of said flexible substructures are formed 180 degrees from each other.

5. The display of claim 2; wherein said flexible substructures have a width dimension; and wherein said notches formed in said flexible substructures are about $\frac{1}{2}$ of said width dimension.

6. The display of claim 2; wherein said flexible substructures have a thickness dimension; and wherein said thickness dimension is in the range of about 0.15 inches to about 0.75 inches.

7. The display of claim 2; wherein said decorative strand is selected from the group consisting of a string of lights, a garland, a string of beads, and a ribbon.

8. The display of claim 1; and further comprising a third flexible substructure disposed between said inner flexible substructure and said outer flexible substructure.

9. The display of claim 8; wherein said notches on each of said flexible substructures are formed 90 degrees from each other.

10. The display of claim 9; wherein said third flexible substructure includes notches formed on the inner and outer circumferences thereof.

11. The display of claim 10; wherein said notches formed on said inner circumference of said third flexible substructure are disposed to cooperate with said notches formed on said outer circumference of said inner flexible substructure, and said notches formed on said outer circumference of said third flexible substructure are disposed to cooperate with said notches formed on said inner circumference of said outer flexible substructure.

12. The display of claim 1; wherein said flexible substructures are made of a material selected from the group consisting of polymers, plastics, wood, composite material, recycled fibers, and fiber board.

13. The display of claim 1; wherein said flexible substructures have outer circumferences; and further comprising a wavy design formed on said outer circumferences for contacting said decorative string.

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14. The display of claim 13; wherein said wavy design is selected from the group consisting of a sinusoidal wave shape, a rectangular wave shape, and a square wave shape.

15. The display of claim 1; wherein said flexible substructures have a generally circular shape.

16. The display of claim 1; wherein said flexible substructures have a generally square shape.

17. A structural framework for a decorative display, comprising:

at least first, second and third flexible substructures comprising continuous strips of flexible material of substantially the same size and shape and having outer surfaces defining an outer dimension for each of the substructures, and inner surfaces defining an inner opening for each of the substructures;

said flexible substructures being sized so that one of the substructures is an outer substructure and the second and third substructures are inner substructures, said substructures having sufficient structural strength and flexibility such that the substructures can be assembled one within another in a fixed relationship relative to each other to form a three-dimensional framework with the outer dimensions of the substructures being coextensive with each other, so that when adjacent substructures are interlocked together, the substructures will maintain their desired shape and form a structural framework and support decorative display wires mounted thereon;

the outer dimensions of said flexible substructures further including a surface that is shaped to retain said decorative display wires on the outer surfaces of said flexible substructures.

18. The structural framework of claim 17, wherein said flexible substructures comprise interlocking mechanisms in the form of interlocking notches formed on cooperating surfaces of said flexible substructures.

19. The structural framework of claim 17, and further comprising a plurality of protrusions formed on said substructures for contacting a light string.

20. The structural framework of claim 19, wherein said protrusions comprise a wavy surface.

21. The structural framework of claim 20, wherein said wavy surface is selected from the group consisting of a sinusoidal wave shape, a rectangular wave shape, and a square wave shape.

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